Fig. 1a

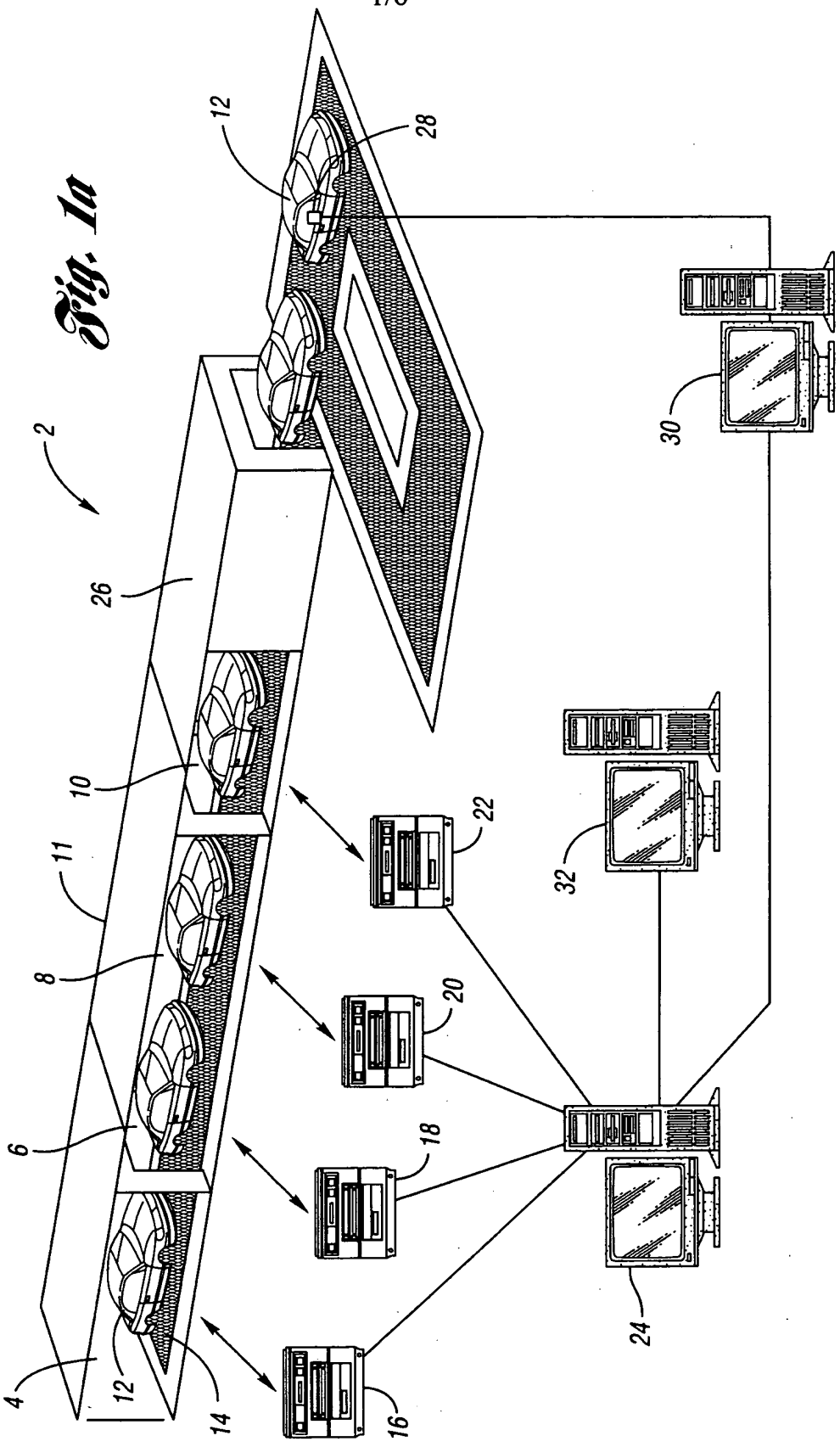
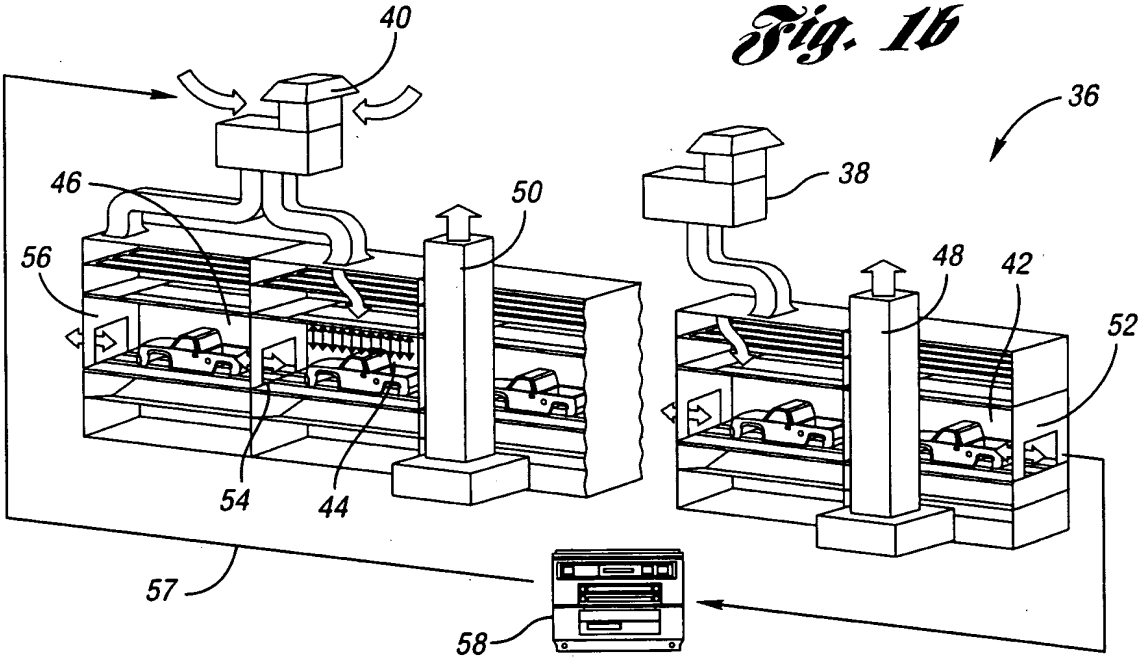


Fig. 1b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36
46
50
38
56
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42
52
54
44
57
58

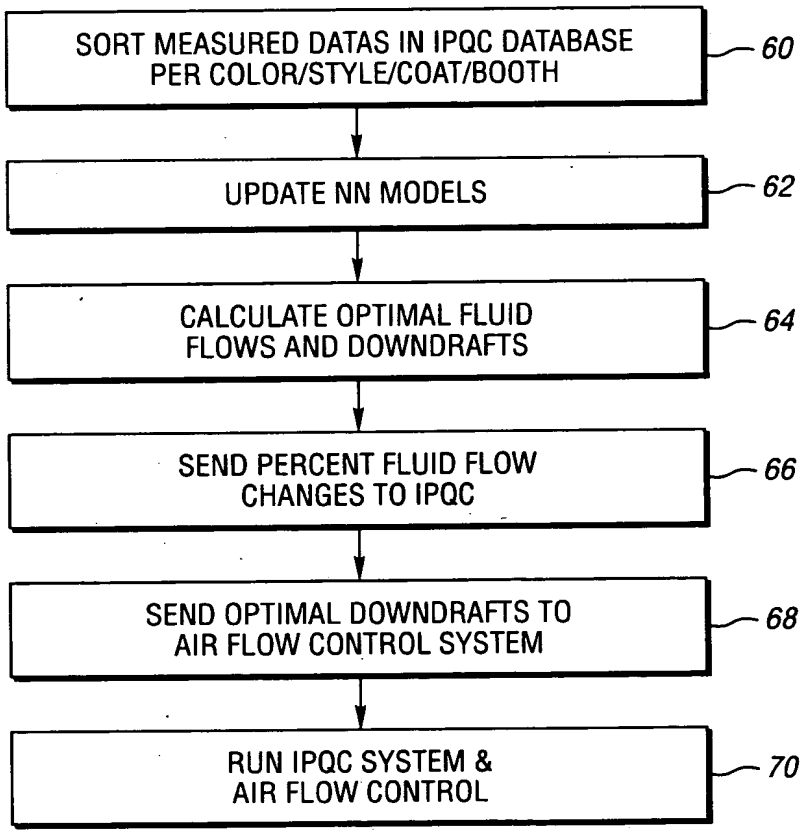
SORT MEASURED DATAS IN IPQC DATABASE PER COLOR/STYLE/COAT/BOOTH
60
UPDATE NN MODELS
62
CALCULATE OPTIMAL FLUID FLOWS AND DOWNDRAFTS
64
SEND PERCENT FLUID FLOW CHANGES TO IPQC
66
SEND OPTIMAL DOWNDRAFTS TO AIR FLOW CONTROL SYSTEM
68
RUN IPQC SYSTEM & AIR FLOW CONTROL
70

Fig. 2

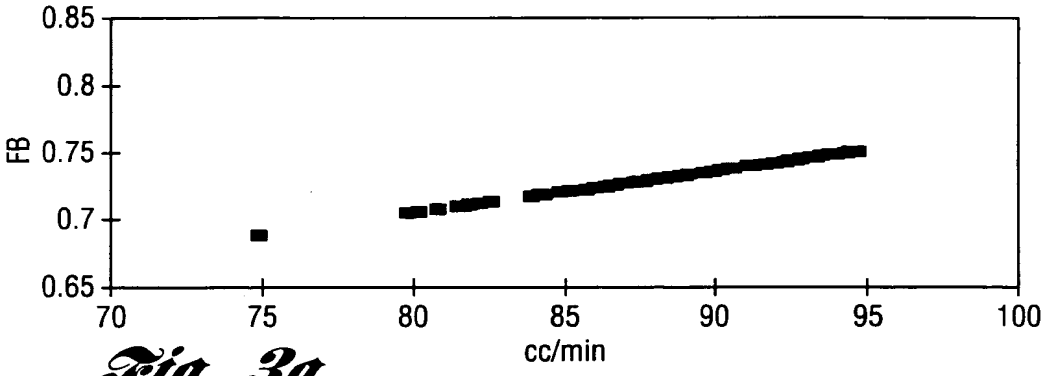

Fig. 3a

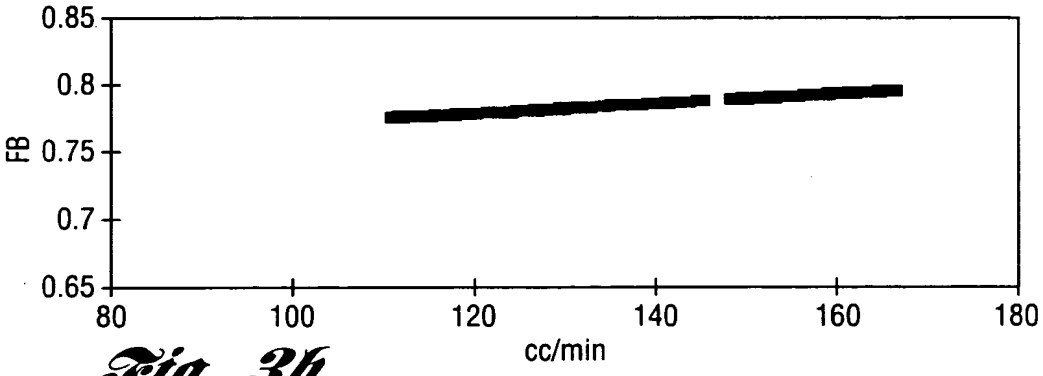

Fig. 3b

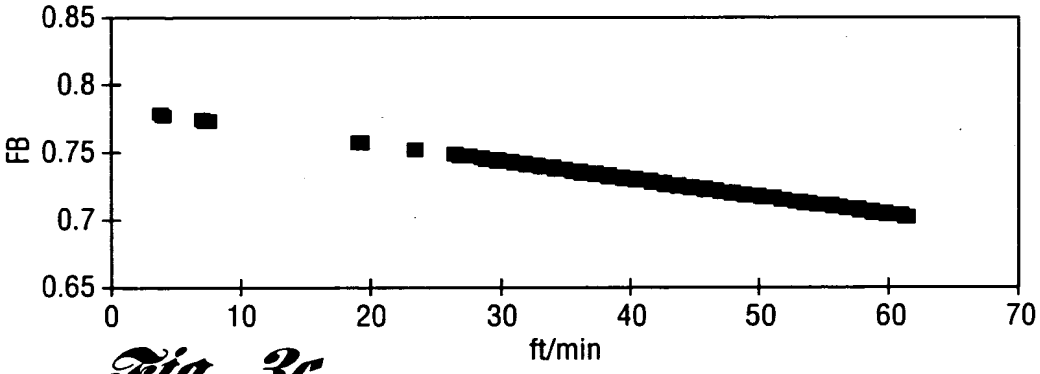

Fig. 3c

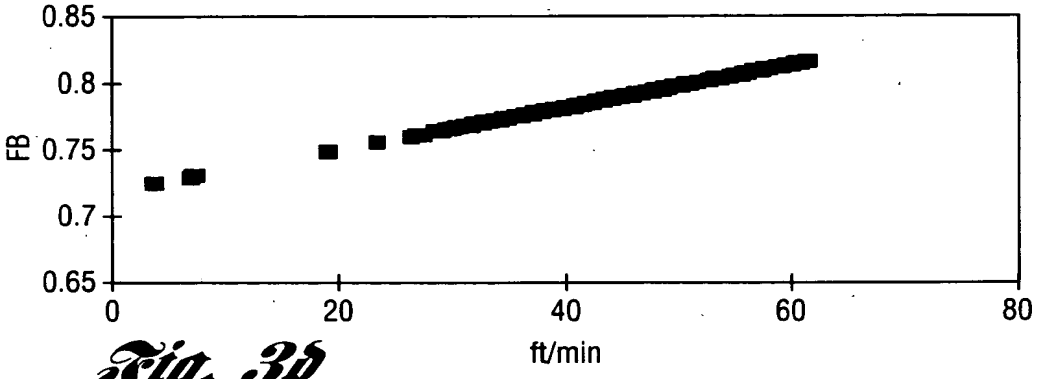

Fig. 3d

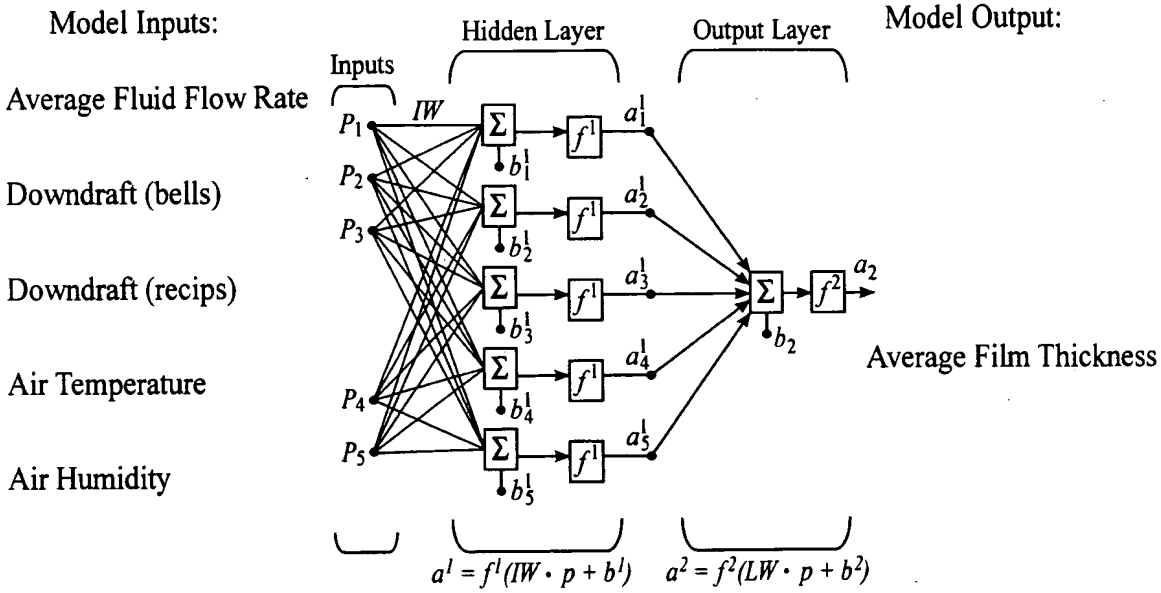
Model Inputs:
Average Fluid Flow Rate
Downdraft (bells)
Downdraft (recips)
Air Temperature
Air Humidity
Inputs
Hidden Layer
Output Layer
Model Output:
Average Film Thickness
IW
$a^1 = f^1(IW \cdot p + b^1)$
$a^2 = f^2(LW \cdot p + b^2)$

Fig. 4

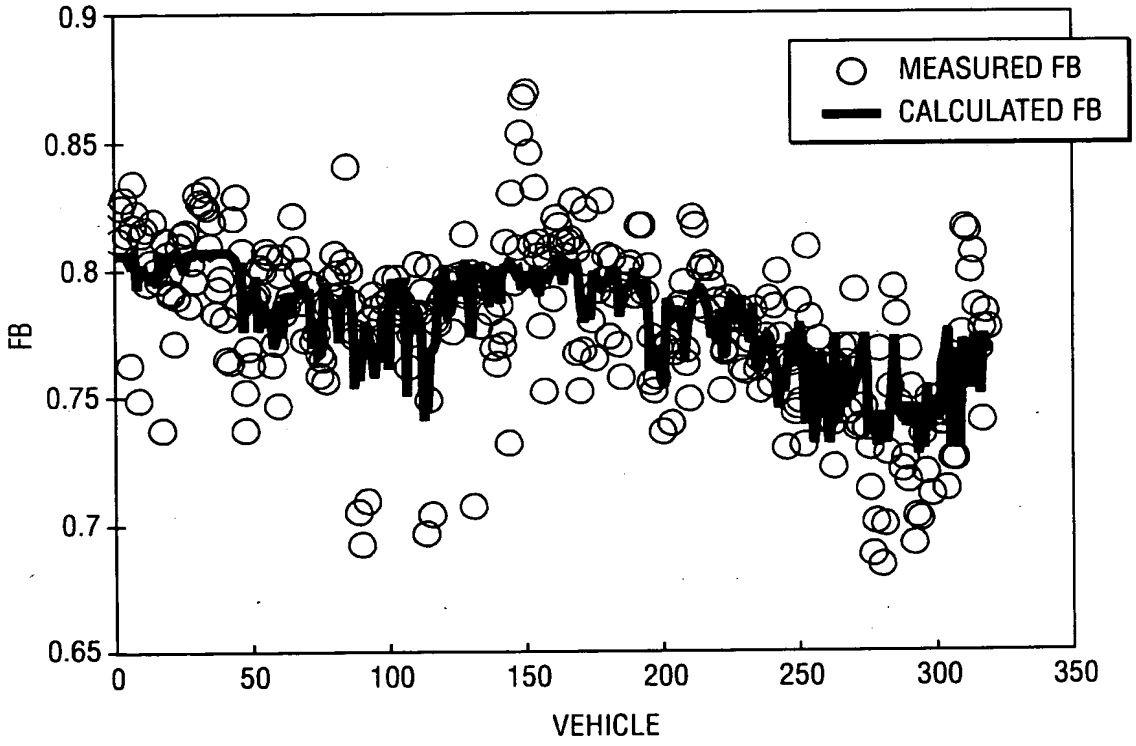
MEASURED FB
CALCULATED FB
FB
VEHICLE
0.9
0.85
0.8
0.75
0.7
0.65
0
50
100
150
200
250
300
350

Fig. 5a

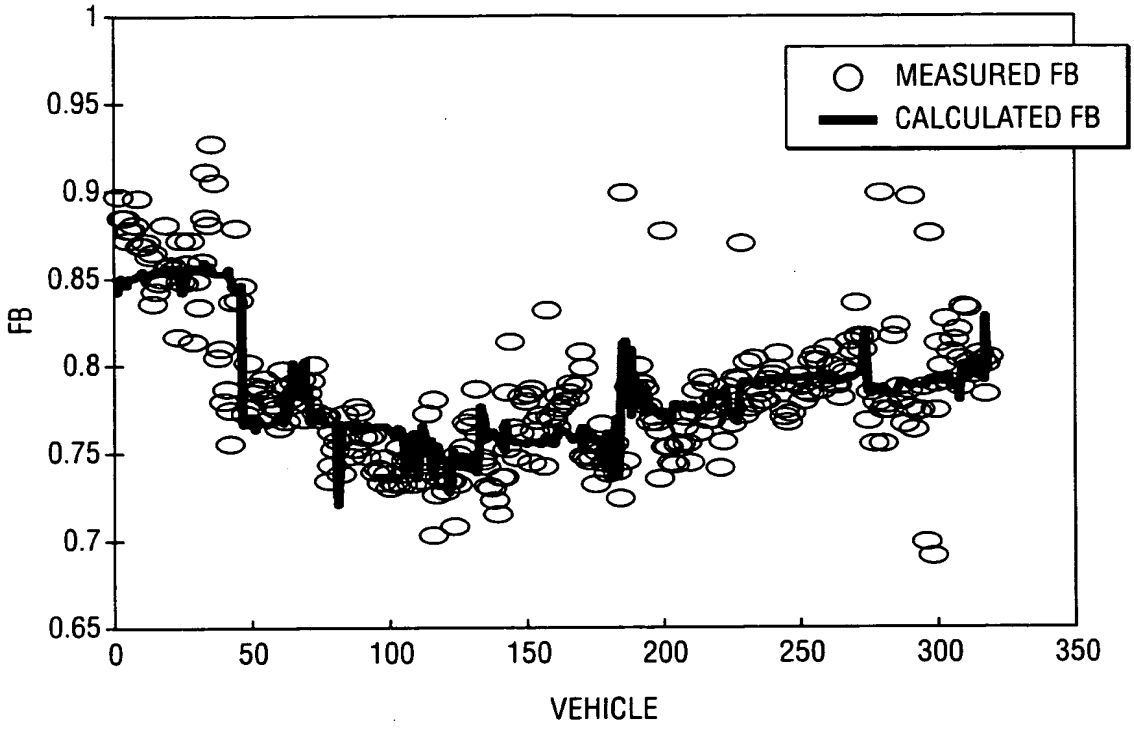
MEASURED FB
CALCULATED FB
FB
VEHICLE
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0
50
100
150
200
250
300
350

Fig. 5b

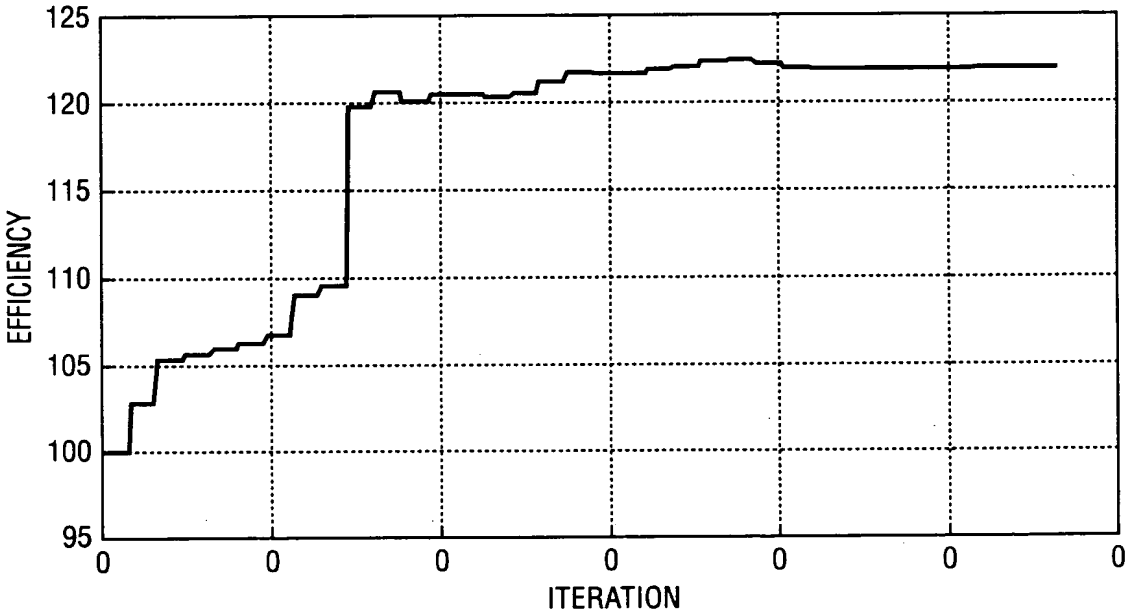
EFFICIENCY
ITERATION
125
120
115
110
105
100
95
0
0
0
0
0
0
0

Fig. 6a

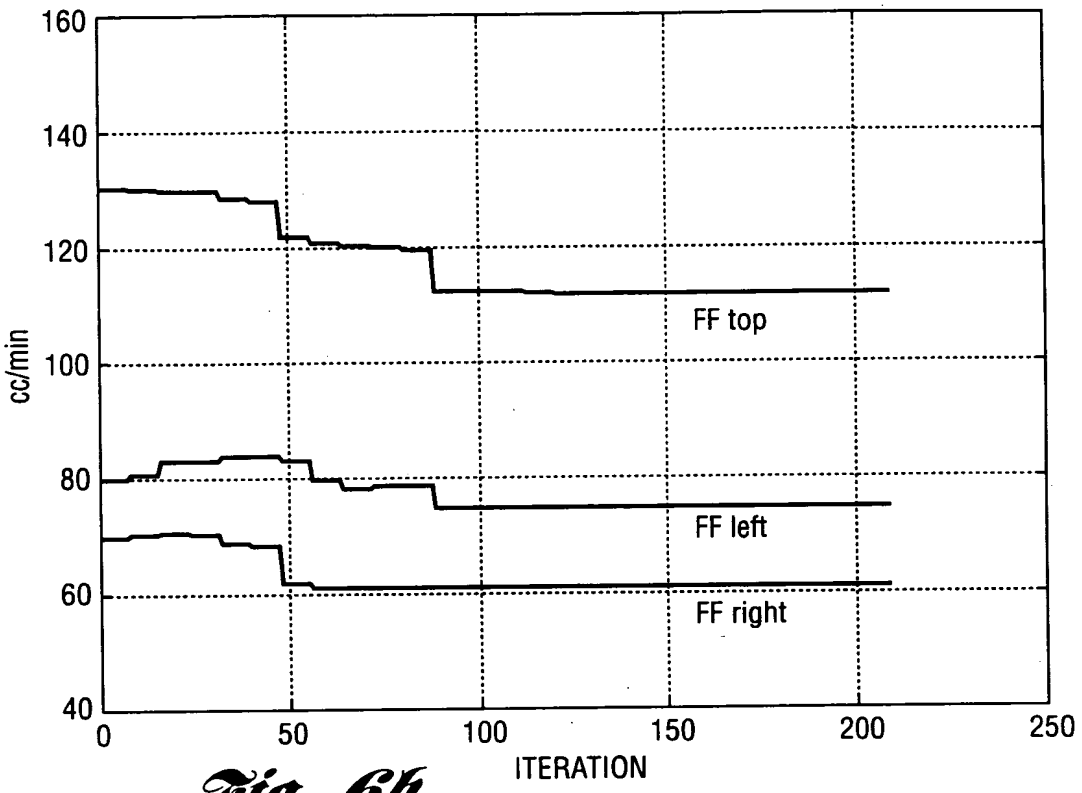
160
140
120
100
80
60
40
cc/min
FF top
FF left
FF right
0
50
100
150
200
250
ITERATION

Fig. 6b

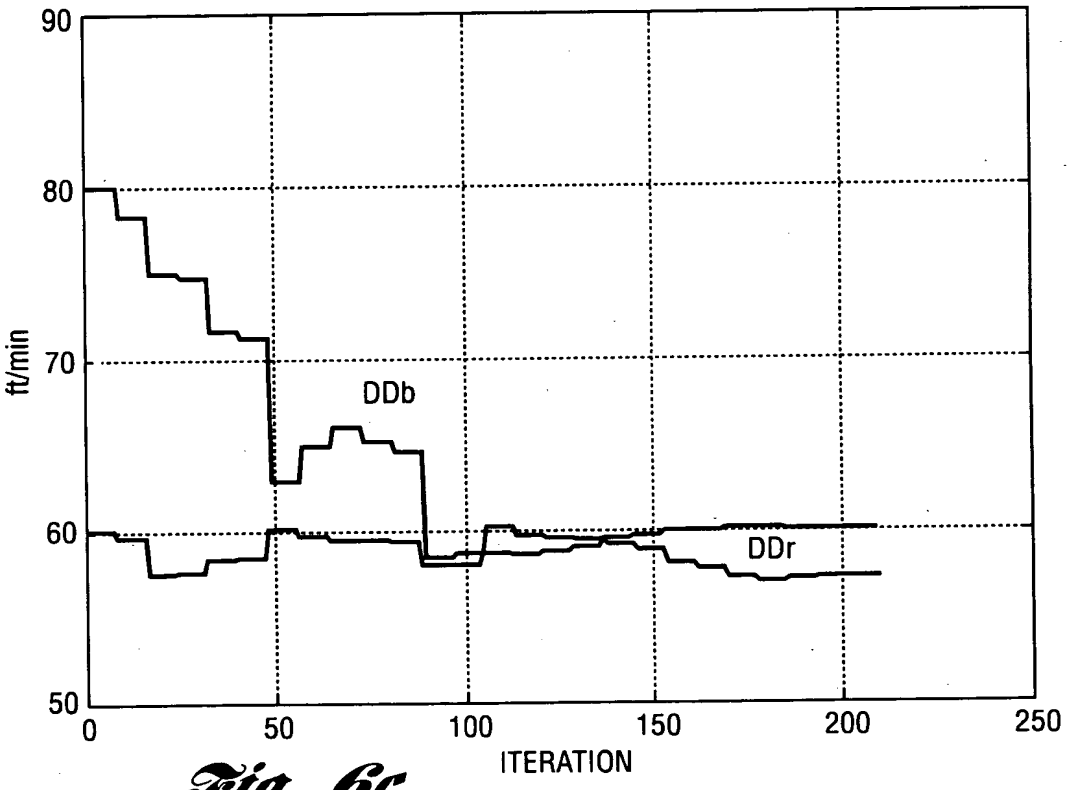
90
80
70
60
50
ft/min
DDb
DDr
0
50
100
150
200
250
ITERATION

Fig. 6c